# CS488/688 - Introduction to Computer Graphics

## Spring 2018

School of Computer Science, University of Waterloo

Instructor: Gladimir V. G. Baranoski, DC3520
Regular Office Hours: Friday 4-5PM
**Project Extended Office Hours: June 22, Friday 4-6PM**
**Project Extended Office Hours: June 29, Friday 4-6PM**

Lecture Times: Monday and Wednesday, from 4-5:20PM, MC4041.

## Revised Schedule

| **Week** | **Date** | **Assignments/Project/Exams** |
|---|---|---|
| 2 | May 9, Wednesday | Assignment 0 |
| 2 | May 9, Wednesday | Tutorial (5:30PM-6:30PM, Room MC4063) |
| 2 | May 10, Thursday | Tutorial (5:30PM-6:30PM, Room MC4063) |
| 3 | May 16, Wednesday | Assignment 1 |
| 5 | May 30, Wednesday | Assignment 2 |
| 6 | June 6, Wednesday | **Midterm Exam (4PM, Room MC4020)** |
| 7 | June 13, Wednesday | Assignment 3 |
| 8 | June 20, Wednesday | Assignment 4 |
| 9 | **June 25, Monday** | **Project Proposal** |
| 10 | **July 4 Wednesday** | **Revised Project Proposal** |
| 13 | **July 23, Monday** | **Project Code** |
| 13 | **July 24, Tuesday** | **Project Demos** |
| 13 | **July 25, Wednesday** | **Project Demos** |
| 13 | **July 25, Wednesday** | **Project Report (4PM, Room MC4041)** |

**Important Notes:** The deadline for the submission of assignment code is **3:30PM** on the days specified as the assignment due dates. The deadline for the project code is **8:00PM** on the day specified above. Assignments and project materials submitted after these deadlines will receive **ZERO** marks. Although the revised project proposal is not marked, if it is not submitted on the due date specified above, the project will receive **ZERO** marks. Assignments and project written documents (reports and proposals) should be handed in at the beginning (first five minutes) of the lectures given at the above specified due dates. Project proposals will be returned in class after they have been marked.

**Course TAs:**

- Petri Varsa (petri.varsa@gmail.com). Office hours: Monday, 11AM-12PM, Undergraduate Graphics Lab, MC3007.
- Mark Iwanchyshyn (iwanchyshyn.mark@gmail.com). Office hours: Tuesday, 11AM-12PM, Undergraduate Graphics Lab, MC3007.

**Course Description**

Software and hardware for interactive computer graphics. Implementation of device drivers, 3-D transformations, clipping, perspective, and input routines. Data structures, hidden surface removal, colour shading techniques, and some additional topics will be covered.

**Course Objectives**

At the end of the course you should be able to:

- write interactive 3D computer graphics programs;
- understand how linear and perspective transformations are used in modeling and rendering in 3D computer graphics;
- understand the process of rendering, lighting, hidden surface removal, and other computer graphics techniques;
- write a simple ray tracer.

**Required Text**

- CS488/688 Course Notes.

**Recommended Texts**

- OpenGL Programming Guide.
- Computer Graphics with OpenGL by Hearn, Baker and Carithers.

**General Overview of Topics**

- The Graphics Environment
- Mathematical Underpinnings
- Transformations
- Picking, Selecting, and Control Tasks
- Hidden Surfaces and Shading
- Ray Tracing
- Physically Based Rendering
- Splines
- Animation

**Marking Scheme**

- Programming component:
  - Assignments: 24%
  - Project proposal: 4%
  - Project: 22%
- Examination component:
  - Midterm: 20%
  - Final: 30%

Students must average at least a 50% in both the programming and examination components of the course to pass. If a student fails to obtain a passing grade on either component, his/her final mark is going to be the mark obtained in this component. The instructor reserves the right, where appropriate, to adjust raw marks downward in the case of cheating and upward in other situations.

**Course Delivery and Expected Behaviour**

For this offering (Spring 2018), class attendance will be particularly critical. Course delivery will consist mostly of traditional lectures with occasional use of slides and technical demonstrations. The following guidelines will apply during this offering:

- In case of missing a lecture, or parts of a lecture, the student will be responsible for obtaining the information and materials provided by the instructor during the lecture;
- The course guidelines provided by the instructor (in this course outline or in class) regarding exams, assignments and project components (proposals, demo and written report) supersede course guidelines employed in previous terms;
- Absence from a lecture, or part of a lecture, will not be accepted as an excuse for not complying with the course guidelines provided by the instructor;
- In case of any issue regarding information provided by the instructor (in class or made available in the course website) about course materials and/or activities (*e.g.*, specifications for assignments or guidelines for the project demo), the students should contact the instructor directly to resolve it before the day scheduled for the given activity (*e.g.*, exam, assignment hand-in or project demo);
- During the lectures, the use of personal computers (or other devices) is not allowed, except with explicit instructor's authorization for assessing or recording information being delivered by him during the lecture.

**Course Work Policies**

- Project marked work will be first returned in lectures and then available during the instructor's office hours.
- Any project submission that remains unclaimed by September 31, 2018, will be destroyed.

- Students should contact the teaching assistants about concerns with respect to the marking of submitted work within two weeks of the date it was first returned to the students. If the issues cannot be resolved between the teaching assistant and the student, the teaching assistant will meet with the instructor, who will make the final decision.
- Use the piazza for general questions about assignments that may be of interest to other students in the course. Do not discuss implementation details (such as code particulars) via piazza. Use the following link to sign up to piazza:

  `https://piazza.com/uwaterloo.ca/spring2018/cs488`

- Use the course e-mail for simple technical issues pertaining only to you.
- Issues requiring detailed answers should be addressed during course staff's office hours.

**University Mandatory Information**

**Academic Integrity:** In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check *www.uwaterloo.ca/academicintegrity/* for more information.]

**Grievance:** A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4, *www.adm.uwaterloo.ca/infosec/Policies/policy*70*.htm*. When in doubt please be certain to contact the department's administrative assistant who will provide further assistance.

**Discipline:** A student is expected to know what constitutes academic integrity [check *www.uwaterloo.ca/academicintegrity/* ] to avoid committing an academic offence, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about 'rules' for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate Associate Dean. For information on categories of offences and types of penalties, students should refer to Policy 71, Student Discipline, *www.adm.uwaterloo.ca/infosec/Policies/policy*71*.htm*. For typical penalties check Guidelines for the Assessment of Penalties, at the following web site *www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm*.

**Appeals:** A decision made or penalty imposed under Policy 70 (Student Petitions and Grievances) (other than a petition) or Policy 71 (Student Discipline) may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72 (Student Appeals) *www.adm.uwaterloo.ca/infosec/Policies/policy*72*.htm*.

**Note for Students with Disabilities:** The Office for persons with Disabilities (OPD), located in Needles Hall, Room 1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the OPD at the beginning of each academic term.